



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/598,023 | 06/15/2007 | Lucy M. MacGregor | DYOUP0319US | 9312 |

23908 7590 10/07/2010
RENNER OTTO BOISSELLE & SKLAR, LLP
1621 EUCLID AVENUE
NINETEENTH FLOOR
CLEVELAND, OH 44115

| |
|----------|
| EXAMINER |
|----------|

CHERRY, STEPHEN J

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2857

| | |
|-----------|---------------|
| MAIL DATE | DELIVERY MODE |
|-----------|---------------|

10/07/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/598,023 | Applicant(s) MACGREGOR ET AL. | |
| | Examiner Stephen J. Cherry | Art Unit 2863 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) 37-50, 53 and 54 is/are withdrawn from consideration.
- 5) ☐ Claim(s) 51 and 55-56 is/are allowed.
- 6) ☒ Claim(s) 1-35 and 52 is/are rejected.
- 7) ☒ Claim(s) 36 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10-17-2007, 8-16-2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-36, 51, 52, and 55, in the reply filed on 4-19-2010 is acknowledged. Additionally, claim 56, dependent upon claim 56, should have been included in group I and will be examined with the elected invention.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-27, and 30-34 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims recite a method that is neither tied to another statutory group, and does not transform underlying subject matter; therefore, the claims are drawn to non-statutory subject matter.

Claims 28 and 35 recite computer readable media for implementing methods; however, the claims do not recite that the computer readable media are non-transitory. Because the scope of the claims includes both transitory and non-transitory computer

Art Unit: 2863

readable, and transitory computer readable media are not statutory, the claims are drawn to non-statutory subject matter.

Claim 52 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claim appears to be drawn to a volume of hydrocarbon as stated in the preamble; however, hydrocarbon is a naturally occurring substance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 52 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim preamble is drawn to a volume of hydrocarbon; however, the body of the claim describes a method of extracting hydrocarbon. It is not clear whether applicant intends to claim the hydrocarbon, or the method of extraction.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Art Unit: 2863

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(f) he did not himself invent the subject matter sought to be patented.

Claims 1-3, 11, 18-26, and 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,825,188 to Montgomery et al.

Regarding claim 1, Montgomery discloses a method of analyzing results from an electromagnetic survey of an area that is thought or known to contain a subterranean resistive or conductive body ('188, col. 6, line 30), comprising: providing electric field data ('188, col. 8, line 41) and magnetic field data ('188, col. 8, line 30) obtained by at least one receiver from at least one horizontal electric dipole (HED) transmitter ('188, fig. 2, ref. 9, with component in horizontal direction); determining a vertical gradient in the electric field data ('188, col. 10, line 24); and combining the vertical gradient in the electric field data with the magnetic field data to generate combined response data ('188, col. 10, line 24).

Regarding claim 2, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 1, wherein the electric field data include a horizontal component of electric field resolved along a first direction and the magnetic field data include a horizontal component of magnetic field data resolved along a second direction, the first and second directions being different ('188, col. 10, line 24, cross product involves 3 dimensional vector calculation).

Regarding claim 3, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 2, wherein the first and second directions are

Art Unit: 2863

orthogonal to one another ('188, col. 10, line 24, cross product involves 3 dimensional vector calculation, with orthogonal vector components).

Regarding claim 11, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 1, further comprising: providing background data specific to the area being surveyed; and comparing the combined response data with the background data to obtain difference data sensitive to the presence of a subterranean resistive or conductive body ('188, claim 5, "g").

Regarding claim 18, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 11, wherein the background data are obtained from a controlled source electromagnetic survey ('188, claim 5, "g").

Regarding claim 19, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 11, wherein the background data are obtained from a magneto-telluric electromagnetic survey ('188, claim 5, "g").

Regarding claim 20, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 11, wherein the background data are further combined response data obtained from another electromagnetic survey of the area performed at a different time ('188, claim 5, "g", "changes over time").

Regarding claim 21, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 11, wherein the background data are calculated from a rock formation model ('188, claim 5, "l").

Art Unit: 2863

Regarding claim 22, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 21, wherein the rock formation model is derived from a combination of geological data and resistivity data ('188, claim 5, "I").

Regarding claim 23, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 22, wherein the geological data are from seismological surveying.

Regarding claim 24, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 22, wherein the resistivity data are from well logging.

Regarding claim 25, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 1, wherein difference data are obtained as a function of position within the area ('188, claim 5, "g", with data a function of position of ref. 3, 11, 41 and 42).

Regarding claim 26, Montgomery discloses a method of analysing results from an electromagnetic survey according to claim 1, wherein the resistive or conductive body is a resistive body ('188, col. 6, line 30).

Regarding claim 28, Montgomery discloses a computer program product bearing comprising a machine readable medium bearing machine-executable instructions for implementing a method of analysing results from an electromagnetic survey according to claim 1 ('188, col. 8, line 51).

Regarding claim 29, Montgomery discloses a computer apparatus loaded with machine readable executable instructions for implementing the method of analysing results from an electromagnetic survey according to claim 1 ('188, col. 8, line 51).

Allowable Subject Matter

Claims 4-10, 12-17, and 27 are rejected, as described above, but would be allowable if rewritten in independent form including all of the limitations of the present claims and to overcome the rejections.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 4 recites, "wherein the first direction is parallel to a line connecting the HED transmitter to the receiver". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 5 recites, "wherein the first direction is perpendicular to a line connecting the HED transmitter to the receiver". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 6 recites, "wherein the vertical gradient in the electric field data is determined by comparing electric field data detected at different heights". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 7 recites, "wherein the vertical gradient in the electric field data is determined by comparing the electric field data and data simulated using a background

Art Unit: 2863

model". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 9 recites, "wherein the vertical gradient in the electric field data at a first receiver is determined by comparing electric field data from the first receiver when the transmitter is above a second receiver with electric field data from the second receiver when the transmitter is above the first receiver, and applying a predetermined adjustment to the electric field data from second receiver". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 10 recites, "wherein the vertical gradient in the electric field data is determined by comparing electric field data detected from a transmitter at different heights". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 12, with dependent claims 13-17, recite, "wherein the background data are obtained by determining a vertical gradient in the magnetic field data and combining the vertical gradient in the magnetic field data with the electric field data". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 27 recites, "wherein the resistive body is a hydrocarbon reservoir". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claims 30-34 are rejected, as described above, but would be allowable if rewritten in independent form including all of the limitations of the present claims and to overcome the rejections.

Art Unit: 2863

The following is a statement of reasons for the indication of allowable subject matter:

Claim 30 recites, “creating a model of the area to be surveyed including a rock formation containing a postulated resistive or conductive body, and a body of water above the rock formation; setting values for water depth, depth of the postulated resistive or conductive body, and resistivity structure of the rock formation; performing a simulation of an electromagnetic survey in the model of the survey area by calculating electric field data and magnetic field data obtained by at least one simulated receiver detecting signals from at least one simulated horizontal electric dipole (HED) transmitter; determining a vertical gradient in the electric field data; and combining the vertical gradient in the electric field data with the magnetic field data to generate combined response data”. This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 35, dependent upon claim 30, is rejected, as described above, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims and further be amended to overcome the rejections *supra*.

Claim 36 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

It should be noted that both claims 35 and 36 correct for the deficiencies of claim 30 and therefore allowable for the same reason as claim 30.

Claim 52 is rejected, as described above, but would be allowable if the rejections are overcome.

The following is an examiner's statement of reasons for allowance:

Claim 52 recites, "providing electric field data and magnetic field data obtained by at least one receiver from at least one horizontal electric dipole (HED) transmitter during an electromagnetic survey of the area; determining a vertical gradient in the electric field data; combining the vertical gradient in the electric field data with the magnetic field data to generate combined response data; identifying the subterranean hydrocarbon reservoir using the combined response data; penetrating the subterranean hydrocarbon reservoir with a hydrocarbon-producing well; and extracting hydrocarbon from the subterranean hydrocarbon reservoir using the hydrocarbon-producing well". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claims 51 and 55-56 are allowed.

The following is an examiner's statement of reasons for allowance:

Claim 51 recites, "providing electric field data and magnetic field data obtained by at least one receiver from at least one horizontal electric dipole (HED) transmitter during an electromagnetic survey of the area; determining a vertical gradient in the electric field data; combining the vertical gradient in the electric field data with the magnetic field data to generate combined response data; identifying the subterranean hydrocarbon

Art Unit: 2863

reservoir using the combined response data; penetrating the subterranean hydrocarbon reservoir with a hydrocarbon-producing well; and extracting hydrocarbon from the subterranean hydrocarbon reservoir using the hydrocarbon-producing well". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Claim 55 recites, "extracting hydrocarbon from the subterranean hydrocarbon reservoir, the subterranean hydrocarbon reservoir having been determined to contain hydrocarbon by means of an electromagnetic survey method comprising the steps of: providing electric field data and magnetic field data obtained by at least one receiver from at least one horizontal electric dipole (HED) transmitter during an electromagnetic survey of the area; determining a vertical gradient in the electric field data; combining the vertical gradient in the electric field data with the magnetic field data to generate combined response data; and identifying the subterranean hydrocarbon reservoir using the combined response data". This feature, combined with additional claimed subject matter, overcomes the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

U.S. Patents 4,617,518 to Srnka, and 7,319,330 to Amundsen disclose related subject matter, but do not disclosed the claimed features described above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Cherry whose telephone number is (571) 272-2272. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A. Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. J. C./
Examiner, Art Unit 2863

Drew A. Dunn
/Drew A. Dunn/
Supervisory Patent Examiner, Art Unit 2863